

Catalysis Today

Volume 89, Issue 3, 30 March 2004, Pages 379-385

Emerging Materials

doi:10.1016/j.cattod.2003.12.012 

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Ethylcyclopentane reactions on alumina supported low loaded platinum-copper catalystsMokhtar Boutahala^a, Brahim Djellouli^a, Nabila Zouaoui^a and François Garin^{a, b}^a Laboratoire de Génie des Procédés Catalytiques, Faculté des Sciences de l'Ingénieur, Université Ferhat Abbas, Sétif, Algeria^b Laboratoire des Matériaux, Surfaces et Procédés pour la Catalyse (LMSPC), UMR 7515 du CNRS-ECPM-ULP 25, Rue Becquerel, 67087, Strasbourg Cedex 2, France

Available online 19 February 2004.

Abstract

This work is focused on the catalytic behaviour of alumina supported low loaded Pt-Cu catalysts. Ethylcyclopentane is the probe molecule. In fact this molecule can lead to several primary reactions as: (i) ring opening, (ii) ring enlargement, (iii) aromatisation, and (iv) hydrocracking. Due to these various pathways we can follow the modifications of the catalytic activities as well as selectivity changes when the surface composition of the «catalyst» is changed. Various techniques were used to characterise these «catalysts»: (i) by TPR we showed that an interaction between platinum and copper is present and (ii) by hydrogen chemisorption we found that the platinum dispersion decreased from 100 to 20% when the copper content increased. The ring opening reaction is «non-selective» for platinum «catalysts» and for Pt-Cu systems with low copper content and is «selective» for «catalysts» with a high copper content. We noted that the apparent activation energy values also changed with the amount of copper which confirms the modifications in the catalytic mechanisms when changing copper concentration. We proposed that the ring enlargement reaction is similar to a bond shift reaction, when ring opening corresponds to hydrocracking reactions. Such comparative relation can help to understand the results obtained.

Author Keywords: Hydrogenolysis; Ethylcyclopentane ring opening; Alloys; Bimetallics; Pt-Cu «catalysts»**BEST AVAILABLE COPY**